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Mr. Richard Patterson, Director
Northeastern Area State and Private Forestry
Grey Towers National Historic Landmark
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On August 23, 2007, USDA Forest Service personnel conducted a gypsy moth egg mass survey at Grey Towers National Historic Landmark. The purposes of this survey were to evaluate the efficacy of this year's treatment, assess the potential for defoliation and the need for treatment in 2008.

Gypsy moth survey plots were randomly selected based upon available host trees (oak species), size of sample area and uniformity between egg mass counts. At each sample point, a 1/40th acre fixed radius plot was established. The plots consisted of a tally of all the new (2007) egg masses observed on the overstory trees, understory vegetation, ground litter and duff. The total number of egg masses observed for each plot was multiplied by 40 to determine the number of egg masses per acre. Egg mass lengths were also measured at the plots to determine the overall "health" of the existing population and as a measure of egg mass fecundity.

The location of the survey plots are shown in Figure 1. The summarized results of the survey are presented in Table 1. Egg mass densities at Grey Towers National Historic Landmark ranged from 0-3960 and averaged 1080 egg masses per acre. Overall egg mass length tended to be large in size, ranging from 28-39 mm and averaging 34 mm. Egg masses larger than 25 mm typically indicate healthy populations.

This year's suppression project conducted on May 19 provided foliage protection for all but half an acre (see defoliation report dated 6/14/07) of the treatment area. Although egg mass densities have decreased 16 percent from last years' level of 1280 egg masses per acre to their current level, the average egg mass length has increased 31 percent from last years average of 26 mm.

The egg mass survey results indicate that areas of light defoliation (30-50 percent) are likely to occur at Grey Towers National Historic Landmark in 2008. Defoliation less that 30 percent generally has little impact on a tree and can not be detected from an aerial survey.

This defoliation prediction is further supported when egg density is also used as a means of estimating gypsy moth population densities. Moore and Jones (1987) found that estimating the mean fecundity would increase the precision of gypsy moth density estimates and that a linear relationship exists between egg mass length and fecundity. Further work by Liebhold et al., (1993) demonstrates that the product of the mean egg mass length (mm) and egg mass density provides a more precise means of estimating population densities and predicting defoliation.

Using Liebhold's model, Figure 2 shows how this information can be used to correlate the predicted defoliation of an area. Accordingly, the estimated egg mass density of 1080 egg per acre (average egg mass density) x 34 mm (average egg mass length) translates to a projected defoliation level of about 38 percent (light defoliation). Because egg mass densities and host type are not evenly distributed, actual defoliation will vary from tree to tree but will be predominately light throughout Grey Towers.

In order to prevent this defoliation, we recommend a single application of *Bacillus thuringiensis* var. *kurstaki* (Btk) applied at the rate of 36 billion international units (BIU's) per acre. With both proper timing and application, gypsy moth defoliation should be prevented, a significant population reduction is likey and the need for re-treatment in 2009 would be unlikely.

At the current time, it does not look like the Pennsylvania Bureau of Forestry will be able to incorporate Grey Towers into their suppression program in the spring of 2008. If needed, I will provide assistance in developing the gypsy moth suppression contract for Grey Towers.

Please call me at (304) 285-155 if you have any questions regarding this egg mass survey or this letter.

Sincerely,

Rodney L Whiteman

RODNEY L. WHITEMAN
Forester
Forest Health Protection

Cc: Kevin Carlin, PA BOF
Tim Morasco, PA BOF
Noel Schneeberger, AO
Robert Lueckel, MFO

REFERENCES

Liebhold, A.M., Simons, E.E., Sior, A., and Unger, J.D, 1993. Forecasting defoliation caused by the gypsy moth from field measurements. Environ. Entomol. 22(1): 26-32.

Moore, K.E.B. and Jones, C.G. 1987. Field estimation of fecundity of gypsy moth (Lepidoptera Lymnatriidae). Environ. Entomol. 16: 165-167.

Table 1 - Results of the gypsy mot egg mass survey conducted at Grey Towers National Historic Landmark on August 23, 2007

Plot #	#em/acre
1	0
2	240
3	2200
4	2240
5	3960
egg masses per acre range = 0-3960 egg masses per acre average = 1080	egg mass size range (mm) = 28-39 egg mass size average (mm) = 34

Figure 1. -- Gypsy moth egg mass survey plot locations at Grey Towers National Historic Site, August 23, 2007.

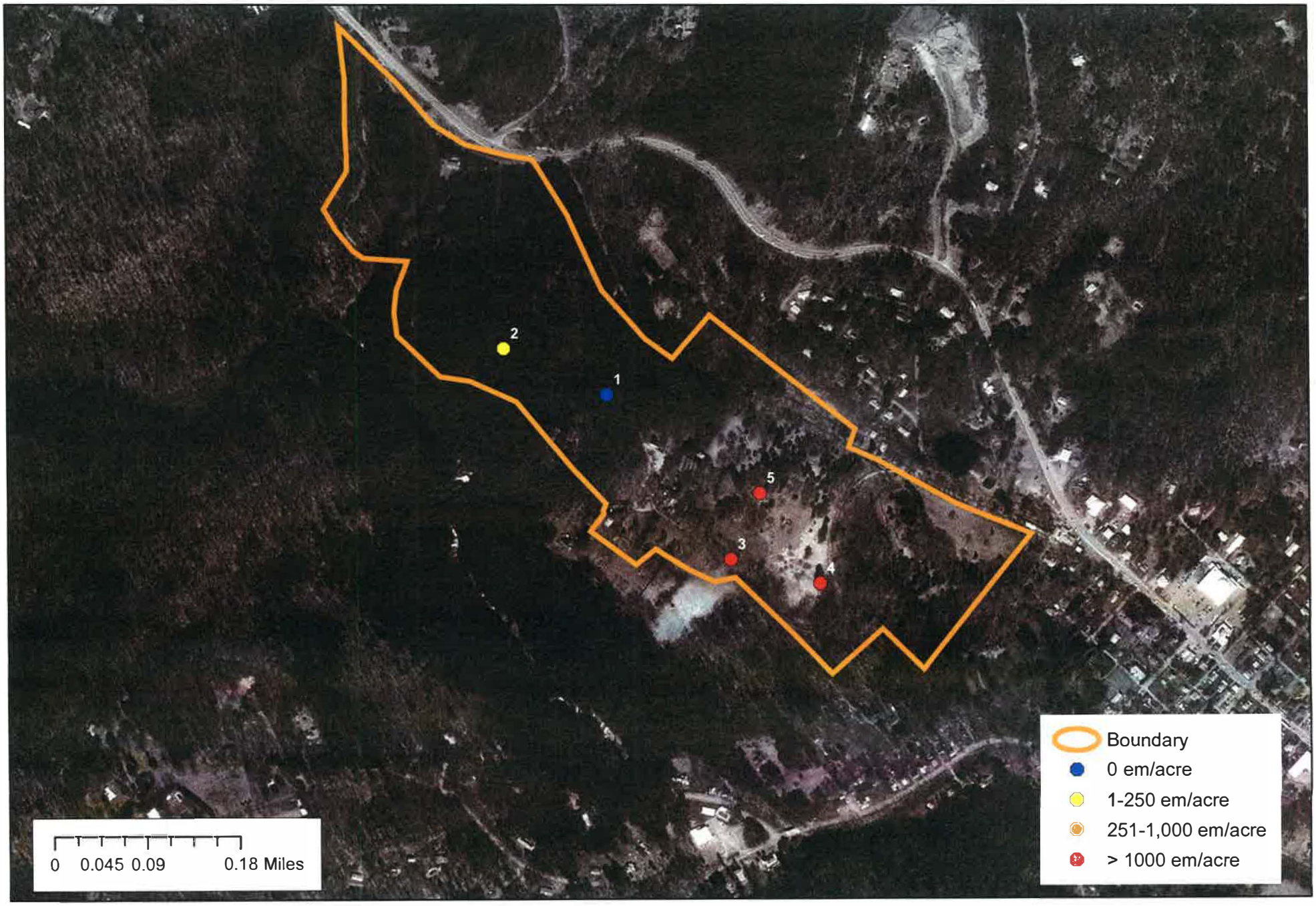
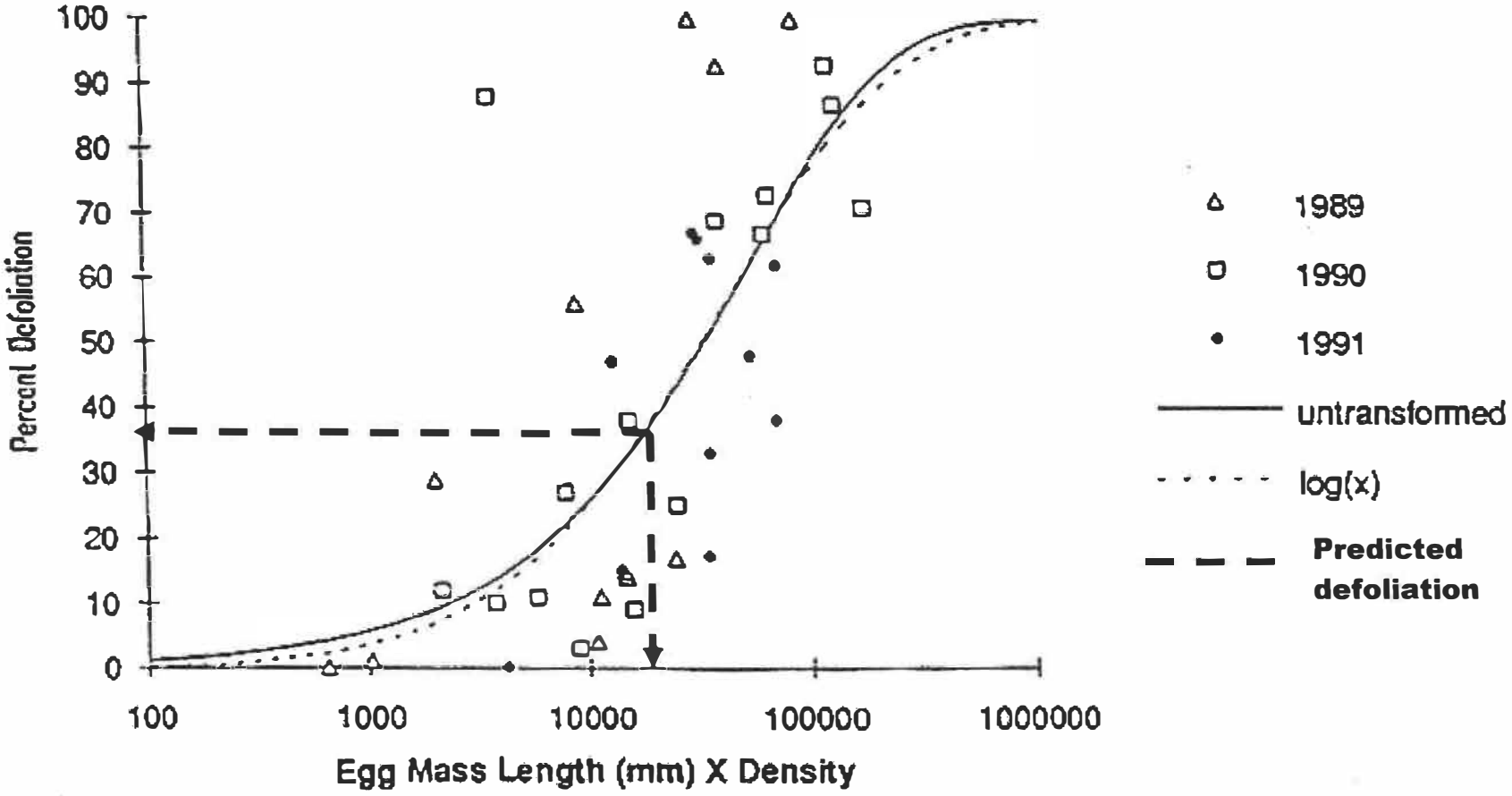


Figure 2.—Predicted defoliation at Grey Towers National Historic Site in 2008.



Scatter plot of the product of mean egg mass length and egg mass density versus mean defoliation. Extracted from Liebhold et al. (1993).